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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/772,424

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John V. Frangioni

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EXAMINER

LUONG, PETER

ART UNIT

PAPER NUMBER

3737

MAIL DATE

DELIVERY MODE

07/17/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/772,424	Applicant(s) FRANGIONI ET AL.	
	Examiner Peter Luong	Art Unit 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6-14, 16-21 and 24-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-14, 16-21, and 24-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimer filed on 4/1/2009 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on Patent No. 7,181,266 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, 6-14, 16-21, and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barbera-Guillem (US 6,333,110) in view of Bryant et al.

4. Barbera-Guillem discloses the use of semiconductor nanocrystals ("quantum dots"), where an outer layer is bonded to the crystal, in in-vivo imaging of tissue. The quantum dots have a core selected from the group consisting of CdSe, CdS, and CdTe (collectively referred to as "CdX"). CdX quantum dots have been passivated with an inorganic coating ("shell") uniformly deposited thereon (column 2, lines 10-18). Furthermore, Barbera-Guillem discloses that the diameter should have a substantially uniform size in the range of sizes from about 2 nm to about 10 nm (diameter) (column 9, lines 27-31). Barbera-Guillem discloses an emission wavelength of 750 nm. An emission wavelength of 750 nm is well recognized as being in the near -infrared wavelength range. Barbera-Guillem discloses imaging vasculature and monitoring

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tissue during surgery. With regard to claim 21 Barbera-Guillem discloses that the excitation light source may comprise a spectrum (visible, or UV, or a combination thereof).

5. Barbera-Guillem discloses the use of water-soluble semiconductor nanocrystals ("quantum dots"), where an outer layer is bonded to the crystal, in in-vivo imaging of tissue. Barbera-Guillem fails to disclose a multi-layer semiconductor nanocrystal.

Bryant et al. teaches "multilayer nanocrystal heteronanostructures" (Page 73, ¶ 1). It would have been obvious to one of ordinary skill in the art to have modified Barbera-Guillem in order to provide a multilayer nanocrystal. Such a modification involves the substitution of one known type of nanocrystal arrangement for another. The selection of the materials would have been obvious based upon known suitability for intended use.

6. With respect to claims 24-25, Barbera-Guillem discloses the use of water-soluble semiconductor nanocrystals ("quantum dots"), where an outer layer is bonded to the crystal, in in-vivo imaging of tissue. Barbera-Guillem discloses various peak emissions within its emission wavelength of 400 nm to 750 nm (columns 14-16). Barbera-Guillem fails to disclose the a peak emission at 752 nm or more. However, since Barbera-Guillem teaches emission in the NIR/IR range, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Barbera-Guillem to wavelengths greater than 750 nm as it is well known to one of ordinary skill in the art for NIR/IR range to be greater than 700 nm. The Examiner notes that as the emission range increases the peak emission would inherently increase and a peak emission at 752 nm or more would be a matter of optimization.

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7. With respect to claim 26, Barbera-Guillem discloses the use of water-soluble semiconductor nanocrystals ("quantum dots), where an outer layer is bonded to the crystal, in in-vivo imaging of tissue. Barbera-Guillem further discloses an excitation spectrum in the range from about 190 nm to about 660 nm (column 3, lines 50-52). Barbera-Guillem fails to disclose the wavelength up to 700 nm. However, it would have been obvious to one of ordinary skill in the art to have modified range of Barbera-Guillem as an optimization of ranges is well within the skill level of one of ordinary skill in the art (MPEP 2144.05).

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barbera-Guillem (US 6,333,110) in view of Bryant et al. as applied to claim 1 above, and further in view of Bawendi et al. (US 2001/0040232).

9. Barbera-Guillem discloses the use of water-soluble semiconductor nanocrystals ("quantum dots), where an outer layer is bonded to the crystal, in in-vivo imaging of tissue. Barbera-Guillem fails to disclose the use of a polydentate ligand as the outer layer. Bawendi et al. teaches water-soluble semiconductor crystals with an outer layer comprising a polydentate ligand. Bawendi et al. teaches that multidentate ligands provide enhanced stability to the water-soluble nanocrystals. It would have been obvious to one skilled in the art to have modified Barbera-Guillem such that the outer layer includes a polydentate. Such a modification involves the substitution of one known outer layer in a water-soluble nanocrystal for another. The advantage of such would be that it would provide enhanced stability to the nanocrystal.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 6-14, 16-21, and 24-26 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments with respect to claims 1 and 13 have been considered, however, are not persuasive. Applicant argues the selection of the semiconductor materials. However, the prior arts disclose substantially the same semiconductor materials. Applicant fails to disclose any structural differences between semiconductor materials of the prior arts and the instant invention. Therefore, the Examiner's position is that it is obvious to one of ordinary skill in the art to select semiconductor materials such that one carrier is confined to the core and the other to the overcoating.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Luong whose telephone number is (571)270-1609. The examiner can normally be reached on Monday - Friday, 9:30 a.m. - 6:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN CASLER/
Supervisory Patent Examiner, Art
Unit 3737

/P. L./
Examiner, Art Unit 3737